Capture Recapture Methods and the Dynamics of Party Activism in Post-War Britain

Introduction

Although it is widely known that the membership of political parties in Britain today is a fraction of what it once was, there have been substantial debates about the changing nature of party activism. Whether activism has fallen alongside membership, when periods of increase and decrease have been as well as the reasons for these transformations are argued over. Debate has been polarised at least in part because there appears to be little evidence for key periods. In this article we address this absence of evidence by using capture recapture methods on normal archival sources to enable us to estimate the changing size and dynamics of activism in Labour's largest and best organised constituency party. Methodologically this moves beyond the uses of 'closed' capture recapture techniques previously seen in the historical literature, introducing both new 'open' methods and new levels of rigor. These developments are of general interest because the methods can be used to provide systematic estimates not just of population size but also of population dynamics from the kinds of sources normally available to historians. Substantively we examine our finding against expectations derived from the four most commonly cited explanations of changing levels of party activism to argue that the key drivers of change cannot be found by extrapolating back from more recent surveys evidence about activism.

Debating Party Activism

The changing nature of party activism in Britain has been much argued about not least because it is seen as one of the core issues in understanding patterns of apathy in post-1945 British politics. Broadly there are four different positions which can be identified in these

debates. Three of these accept that there has been decline, but differ in the explanation for this, whilst the fourth suggests that levels of activism have not changed much over the period.

The first two positions agree that falling levels of activism are the result of the decreasing supply of individuals willing to work for parties. One associates activism decline with a general pattern of falling party identification in the wider public, particularly measured by the long term decrease in party membership. Without direct measures of activism over the whole period the overall model, which we label 'party identification response' is more assumed than demonstrated. Indeed, it is only for the past twenty years, where surveys have been conducted, that analysis has established that there has been real decline in activism. Moving from these surveys conducted since 1989 to comment on the longer term has involved projecting contemporary motivations back in time. In particular Patrick Seyd and Paul Whiteley, stress the overwhelming importance of the 'selective incentives' particularly associated with achieving outcomes only available those wielding power as local councillors. Placing central emphasis on motivations surrounding local councillors, which we label the 'selective incentives' model, they suggest that declines in activism stem from the removal of substantial powers from local government in the 1970s and 1980s.[1]

Against this stands an account of declining activism rooted in the falling demand by political parties for activists, attributing the main changes to technology which has supposedly rendered local level campaigning less important to electoral results. As initiatives to recruit activists relied almost entirely action at the local level these explanations imply that the best organised constituencies, where recruitment was emphasised and maintained over time, would have had very different trajectories of activism than the more typical less well organised parties. We therefore label this account of local level activism as an 'organisation response' model.[2]

However, the whole picture of decline has been questioned with the suggestion that it is based on ‘romantic myths of a golden age of mass parties’. This view combines scepticism about notoriously unreliable membership with the observation that even if membership has fallen then there ‘is little evidence available to monitor whether trends in party *activism* have fallen ... in parallel with membership’. Perhaps the leading advocate of this sceptical position, Susan Scarrow, presents an alternative model of 'core stability' suggesting that whilst the social members of political parties, those attracted by the clubs, dances and whist drives, may have all disappeared the real base of activists doing core political work has been relatively untouched.[3]

The relative merits of these four different explanations of the dynamics of activism can then be addressed by considering a series of questions about activism at the local level. Specifically the key question are: the stability or otherwise of the activist base, the variation in trajectories of activism between the best and worst organised local parties, the relationship between levels of activism and broad measures of party support and the importance of councillors in the overall picture.

In recent years historians interested in these questions have turned to the study of local political parties because they offer the only real opportunity to investigate the alternative hypotheses in the period before surveys were conducted. The records of local constituency parties, minute books, pamphlets, newssheets, annual reports, attendance books, election materials and correspondence provides the main remaining evidence of both day-to-day and election-to-election grass roots political activity. The analysis of this material to date has broadly supported the 'core stability' view by pointing to the ways in which organisation was always problematic even during the supposed 'golden age'. These sources have provided evidence of the dissatisfaction at all levels with the state of local activism. Perhaps the most famous example being 1955 Wilson Report and its claim that Labour's organisation was 'at

the penny-farthing stage in a jet propelled era' and its machine was 'getting rusty and deteriorating with age'. For the crucial post-1945 period when membership peaked historians have followed the broad outlines of this report, with local party material used to illustrate the ways in which the Labour Party's activists possessed an aging mindset stuck in the 1930s, working in decrepit party premises in opposition to the new politics of 'affluence'.[4]

Yet despite this interest, contemporary complaints about insufficient and declining levels of grassroots activism, whether from national leaders or activists on the ground, are poor evidence of the actual numbers involved or the direction of change. Claims about grassroots strength often aimed not to give an objective summary but to affect behaviour, for example with claims of weakness made to internal audiences to stimulate further activity. In any case the impressions held by contemporaries may have been wildly inaccurate; sociological studies have found that voluntary activists in general are often motivated precisely by an unreasonably low expectation of anyone else undertaking the work they do.[5]

If we put aside contemporary comments then attempts to infer more directly how many individuals were involved, in which roles and for how long are then subject to considerable difficult. Sources were created unevenly in the everyday activity of the organisation and much of that which was produced has been lost. Activism is varied in nature, and the behavior of activists of different types can be expected to be equally varied. Those holding prominent positions are very likely to appear in party sources whilst at lower levels many, perhaps most, do not appear in the records at all. Thus, the individual level information available on activists in the past is unrepresentative and for most individuals sparse or non-existent. The challenge for those approaching grassroots political activism, shared in common with other historians interested in elusive questions about population dynamics, is to generate independent estimates of the size and dynamics of the activist population from such problematic source material.

Although substantial, the issues involved are in crucial respects the same as those confronted in other disciplines where the extreme difficulties of drawing robust conclusions from observations of small and potentially unrepresentative components are directly confronted. Capture Recapture methods represent perhaps the central tool in the analysis of data like this in disciplines from population biology to information technology and sociology. Introduced over a century ago as a way of attempting to measure population size they have developed substantially since. Broadly capture recapture methods may be described under two headings, ‘closed’ methods look at the population at a particular point in time with the primary purpose of estimating population size, and ‘open’ methods which look over time with the aim of estimating population dynamics. The is a very well developed literature on these methods accompanied by thoroughly documented and user-friendly software which incorporates a the full-set of tools necessary to carry-out all stages of the statistical analysis. In practice this software takes care of all calculations, and the formal derivation of the methods is well presented in the statistical literature. Thus, in the following sections we present a basic overview of the methods with the main aim only of outlining their logic and describing how analysis is conducted.

Population Size Estimation and 'Closed' Capture Recapture Methods

'Closed' capture recapture methods were developed to address questions of population size such as ‘how many fish there are in a lake’ by collecting multiple samples where the population is assumed to be unchanging (closed) between samples. In the initial biological application the idea was to go fishing one day catching a specific number of fish and putting a coloured mark on them, then going fishing the next day and seeing what proportion of the fish caught on the second day were marked. Crudely if there were a lot of fish in the lake a very small proportion of the total would have been marked so in the second day’s catch we would expect very few marked fish. Conversely with a small number of fish in the lake we

would expect to a large proportion of our second catch to be marked. More formally the total population (N) can be estimated by comparing the fish caught on both days (N_{11}) with the numbers captured in only the first day (N_{10}) and only the second (N_{01}), using the formula:

$$\hat{N} = N_{11} + N_{10} + N_{01} + \frac{N_{10}N_{01}}{N_{11}}.$$

The appropriateness of population estimates using this formula depends on two basic assumptions. First, that the population is closed, that it does not change between the two measures. Second that there is homogeneity of capture, that every fish has the same probability of being encountered.[6]

In general with any human population it is unlikely that the assumption of homogeneity will be met, and several methods have been described for using additional information to deal with this. Perhaps most obviously, where heterogeneity depends on measured covariates, for example type of political activity, then separate estimates can be generated for each category of activist. However, even within categories assumptions may be violated because some individuals are more likely to be encountered than others. If we have more than two sources which record encounters then these violations can be empirically investigated. For example with three sources and some individuals who are more prominent than others we will find that those encountered in both a first and second source will be more likely to show up in the third than those observed in the first source but not the second. The most common approaches to enable insights of this kind to address such dependencies are log-linear and sample coverage approaches.

Log-linear models of closed capture data approach the problem by considering contingency tables. A table is constructed such that presence or absence on the *i*th list defines the categories for *i*th dimension. Where t is the number of lists this gives an incomplete 2^t contingency table with the value of one cell unknown, corresponding to those who are unrecorded in every list. Heterogeneity of encounter probability, that there are patterns such

as some individuals being systematically more likely than others to be encountered, will mean that occurrence on one list can be used to predict occurrence on another. This will show up as a significant interaction in log-linear models of the table. However, precisely because we have constructed a model of these dependencies we can provide an estimate of the unlisted population even when assumptions of independence of lists are violated. If the no reliable model can be constructed then this will show up in very large confidence intervals.

Sample coverage approaches address the same issue from a slightly different perspective. In considering questions of dependency between lists, individuals who appear on more than one list can provide information about dependency whilst those who appear on only one list cannot. Our confidence about how well we have modelled these dependences is greater when a larger proportion of the sample appears in more than one source and we thus have more information about dependencies. This can be measured by considering the sample coverage, the estimated proportion of the overall population where information comes from more than one source. The statistical literature suggests that if sample coverage is sufficiently great (>0.55) then an estimate of population size can be provided even in the presence of dependency. Log-linear and sample coverage approaches therefore provide two means of estimating population size in the presence of heterogeneity, and also diagnostics to suggest whether assumptions are reasonable.[7]

Population Dynamics and 'Open' Capture Recapture Methods

'Open' capture recapture methods, dominant in the population biology literature, extend the method to the dynamic question of change in the population over time. This is done by dropping the assumption of 'closure' focusing precisely on the changes between samples, in particular on the question of whether individuals 'survive' in the population from one sample to the next. In order to separate out the dynamics of the underlying population from the consideration that only a portion of the population appears in each of the sources we need to

recognise that the probability of observation over time are a combination of two probabilities: a probability of appearance in the source, ‘capture’ or 'encounter' (*p)* and a probability of remaining in the population between sampling points, or ‘survival’ (φ).

The basic approach to separating underlying population dynamics from influence of the sources can be illustrated with a simplified example following through an initial group of individuals observed in one year and then followed through two subsequent years. The observation of these individuals can be presented in the form of 'encounter histories' where '1' indicates an encounter and a '0' that there was no encounter. As in this example departures from a population are allowed, but additions to it are not, there are four possible encounter histories: 111 indicating that an individual was observed on all three occasions, 110 that they were observed on the first and second but not the third occasion, 101 observed on the first and last occasions only and 100 that they were observed on the first occasion only. We define the parameters p_j as the probability of encounter at time j and Φ_j is the probability of survival from time j to time $j+1$. The task is to estimate survival parameters (ϕ_1, ϕ_2) between the years and encounter parameters (p_2, p_3), for each of the years. The central difficulty is illustrated by considering that where an individual is not encountered after the first occasion (encounter history 100) we do not know if they have left the population or if they are still there but just not encountered. To deal with this we make the following assumptions: that there is: homogeneity of survival and encounter (that every individual present has the same probability of being encountered and of surviving between periods), that records relating to the same individual over time are perfectly linked, all lists are created instantaneously that there is no temporary emigration from the population. With these assumptions and encounter histories over three years we can separate estimates of the probabilities of leaving the population from the probability of remaining in the population but not being observed. This can be seen by considering all the individuals encountered in both the first and last years

(encounter histories 101 and 111). All these survived to the third year, so we know that they also survived to the second year. Crudely if most of those individuals surviving to the third year were also seen in the second year then we know the probability of encounter then was high. More formally, and bearing in mind that 1-p_j and 1- Φ_j represent probabilities of not being encountered and not surviving respectively, we can obtain the probabilities of generating each encounter histories by considering it as a sequence of events. These sequences, along with descriptions of them and the resulting probabilities for the four encounter histories are shown in table 1. From these results we can see that:

$$\frac{N^{111}}{N^{101}} = \frac{\phi_1 p_2 \phi_2 p_3}{\phi_1 (1-p_2)\phi_2 p_3} = \frac{p_2}{(1-p_2)}$$

therefore

$$\hat{p}_2 = \frac{N^{111}}{N^{111} + N^{101}}.$$

Using this estimate of p_2, together with the total number of observed individuals in the second period we can obtain an estimate of the number of individuals surviving to the second period (including those who were not observed) as:

$$\frac{N^{111} + N^{110}}{p_2}.$$

This, as a proportion of the initial population, gives the probability of survival $\hat{\phi}_1$.

----Table 1 about here---

These estimates rely on subsequent appearances so it is not possible separate out the estimates of survival and capture in the final period. Hence it is possible to estimate separate encounter probabilities for each period except the first and last and survival probabilities between each period apart from the final interval. Natural extensions, including more than three occasions and allowing additions to the population affect the complexity of calculations but not their underlying logic. It should of course be remembered that even where the models

are appropriate estimates may be subject to significant standard errors. Nevertheless, this provides a basic approach to estimating survival and encounter probabilities and hence an underlying logic by which inferences can be made about underlying population dynamics from partial observations over time.[8]

Although 'open' methods do not deal with population size directly, by comparing the rate of departures from a population to the rate of additions the rate of change of the population can be investigated. As we have shown above, patterns of encounters running forwards over time provide evidence about departures from the population. Looking at the same evidence but running backwards over time provides evidence about recruitment to the population. In intuitive terms, and again calculating the probability of presence but no encounter, if an individual was observed regularly in a later period but not encountered at all in an earlier period then it is likely that they were recruited to the population shortly before the later period. Combining estimates of recruitment with estimates of retention or survival it is possible to examine rates of population change over time (λ=population at t+1/population at t). Where $\lambda>1$ this indicates population growth, and where $\lambda<1$ this indicates population decline.[9]

In the initial years of the use of the method the estimation of parameters such as population change, probabilities of survival and capture was regarded as the conclusion of an analysis. However, with methodological advances it is more appropriate to view the conclusions obtained by such an analysis as a starting point from which further questions can be asked. Two are particularly important. First, are the estimates of parameters invalid because the assumptions on which they are based were violated Second, are there better models available in the sense either that they provide a much better fit to the observed patterns of encounters or alternatively that are more parsimonious and thus provide smaller errors on parameter estimates. The question of the validity of assumptions is in obviously

more fundamental than the question about alternative models and one major set of reasons why an alternative model performs better is because one or more assumptions are violated. Nevertheless, because testing assumptions depends on processes most easily explained in that context, for the sake of exposition we deal with the question of model selection first.[10]

In models such as the one described above there are separate estimates of survival and capture parameters in each time period. For example consider an 'open' situation in which there are six encounter periods. In this case there are 10 parameters: five survival parameters: ϕ_1, ϕ_2, ϕ_3, ϕ_4, ϕ_5 and five capture parameters: p_2, p_3, p_4, p_5, p_6 although there is no means of estimating ϕ_5 and p_6. Of course we could come up with much simpler models than this. For example rather than allowing capture probabilities to vary between different time periods we could assume that it is constant over time, we then have one parameter for capture rather than five giving a model with six parameters: ϕ_1, ϕ_2, ϕ_3, ϕ_4, ϕ_5, p. In this case all the parameters are estimable; the final survival parameter ϕ_5 can be approached because we have an estimate *p* in the final time period (it is assumed to be the same as in every other period). Other even simpler models can be proposed, such as the two parameters with constant survival and capture probabilities. We can also construct models that have combinations of constant and time variant components, for example with constant survival rates for three years and then varying after that. Given this the number of possible models combining combination of fixed and time varying parameters quickly extend into very large numbers. Of course the key question is not whether we can construct such simpler models, but which one is to be preferred, and is any better than the original model with 10 parameters.

This question of which model is the 'best' can be addressed by considering the tradeoffs involved in adding more parameters to a model. It is a necessary consequence of adding more parameters to a model that the fit of the model to the data will improve, just as if more terms are added to a multiple regression model then R^2 will increase. However, against

this, the cost of adding more parameters is that the precision of estimation for each of them will decrease. This trade off, which is common to all forms of model building, can be addressed using the Akaike's Information Criterion (AIC) a tool also used in model comparison in other contexts such as the assessing different regression models. The AIC calculates this trade off by placing the fit of the model in terms of the model likelihood alongside the number of parameters, where L is the model likelihood and K is the number of parameters:

$$AIC = -2\ln(L) + 2K$$

By comparing the AICs of different models we can assess whether the gain in goodness of fit of a model with more parameters is 'worth' the additional parameters. In this way we can address the question of raised above which model we should prefer. The model with the lowest AIC has most support in the data.

Approaching model selection in this way is not just a matter of obtaining more precise parameter estimates. It is also equivalent to statistically testing substantive hypotheses. Analysis begins from a general model, such as the model described above where both survival and capture probabilities are allowed to vary across time. Substantive hypotheses about population dynamics are then addressed by comparing the AIC of different models. If for example a model with ϕ varying over time (say the general model) has a lower AIC than the model with ϕ constant then this can be taken as equivalent to testing and rejecting the hypothesis that there is a no significant variation in survival over time.[11]

This process of model selection is rigorous in its own terms, but its only appropriate if the assumptions of the general model from which we begin are met. If, for example, different individuals have different probabilities of being encountered, or there are systematic differences in survival probabilities the estimates will be systematically biased. There are well established ways of checking whether basic assumptions are met with Goodness of Fit

(GOF) testing. The standard tests have the uninformative names: 'Test 1', 'Test 2' and 'Test 3'. Test 1 looks only at systematic differences between groups, for example between males and females, and in situations where we can identify individuals its use is actively discouraged. Test 2 might be thought of as testing homogeneity of encounter. It takes individuals who survive in the population between j and j+1 (ie those observed both at, or before, j *and* at or after j+1) and examines whether those observed at j have a different probability of being observed j+1 from those who were not observed at j. Test 3 might be thought of as testing homogeneity of survival. It compares the survival rates to j+1 of those first seen at j with those observed before j. Significant results in Test 2 might be caused by for example some individuals being easier to observe than other. Significant results in Test 3 might be caused by younger individuals being both more recently first observed and also less likely to survive in the population than established members. In both cases violations lead to systematic errors in parameter estimates. If there are significant results in the GOF tests this indicates that the assumptions of the general model are systematically violated. Analysis needs to begin with an alternative general model which is not based on assumptions which are systematically violated. However, by identifying the problems in more this process also helps point to ways in which a model with more parameters than the ones we have so far discussed is appropriate.

For example a significant result in Test 3 indicates a difference in survival rates between individuals who have recently been observed for the first time and those who were first observed in the more distant past. This might be addressed by adding parameters to the general model from which analysis begins. We can treat individuals first encountered in each time period as a cohort. We can then estimate separate survival and capture probabilities for each cohort in each time period (although obviously later cohorts are around for fewer time periods). For example where there are six time periods there would be five cohorts; individuals first encountered in the first period as cohort 1, those first encountered in period 2

as cohort 2 and so on. For the first cohort we have ten parameters, five survival and five capture parameters on a similar basis to the model seen previously. The second cohort is around for one less period so there are eight parameters relating to them (four survival and four capture), six for the third cohort, four parameters for the fourth cohort and two parameters for the final cohort. Thus considering cohorts creates a general model with 30 parameters compared to the general model with 10 parameter when we did not. We can then use model selection techniques to empirically examine whether there are systematic differences in survival and capture probabilities between different cohorts and at different times.[12]

Other reasons why assumptions are violated can also be identified. For example, in trajectories of political activism we would expect, say, elected officials to be both easier to encounter and more likely to remain active in a political party than those who do not hold elected positions. When characteristics are fixed over time, like sex, separate parameters can be estimated for each group. However, something like being an elected officials is a state which can change over time. To deal with this, multi-state models are used which involves adjusting both the idea of an encounter history and increasing the parameters in the models. For multistate models encounter histories are adjusted to enable an indication of the state in which we encounter each individual in each time period. For example we might have a six period study of political activism, with two states of activism, with 2 being an elected official and 1 being an activist without such a position. In this case the encounter history 202001 would indicate an individual encountered as an elected official on the first and third occasions, as a regular activist on the final occasion and not encountered in the other periods. Such models involve considering not just survival (where survival parameters in multi-state models are conventionally labelled S) and encounter probabilities but also parameters for the probability of movements between different states. These transition parameters (ψ) are

estimated in addition to survival and recapture rates in each time period for individuals in each ‘state’. There are thus considerably more parameters in such a model. For example in the six encounter, two state situation described above, without considering cohorts, would have thirty parameters: five survival and five encounter parameters for the elected officials, the same for the regular activists, then five transition from elected official to regular activist and five transition from regular activist to elected official. For such multi-state models goodness of fit tests have been developed which are broadly similar to those seen for Tests 2 and 3 described above to examine whether basic assumptions are met, for example, one ‘Test3G.SR’, checks whether the re-observation probability of individuals observed at any time in different states varies between those who have been seen before and those who have not been seen before.[13]

In summary then open capture recapture models can be used to analyze patterns of retention and recruitment, the transition of individuals between different states (or roles) and the probabilities of encountering individuals in sources to study population dynamics and changing population size. The procedure for conducting this analysis involves the following stages. First, a general model is selected which has a sufficiently good fit to the data to indicate that model assumptions are broadly satisfied. Then simpler models are generated by considering substantive hypotheses about the behavior of individuals (using survival and transition parameters) and about the evidence base or sources (using encounter parameters). These simpler models are compared to the general model and to each other using the AIC, where the model with the lowest AIC has the most support in the data. In identifying this simpler model we obtain information about the population dynamics in two ways. First as particular models are rejected we distinguish those relationships which have support in the data from those which do not have support in the data. Second, once we have identified the

model with the most support in the data the parameter of this model give estimates of the dynamics of the underlying population.

Capture Recapture and Party Activism in South Lewisham Labour Party

The four different explanations of why levels of activism did, or did not decline, generate different versions of what would be expected to happen to activism at local level. 'Organisational response' models in particular create the expectation that the best organised constituencies will exhibit very different trajectories of activism from the norm. For this reason the South Lewisham Labour Party (SLLP), the largest of Labour's constituency parties at the time when the party nationally was at the height of its own membership provides an important test case. Not only was this party the largest, it was also the home of London Labour party boss Herbert Morrison, and was seen by him, and the Labour Party more broadly, as a model of good organisation throughout the period. If decline in general was caused by organizational disinterest then the SLLP should display a very different pattern.[14]

Methods and Sources

There is a reasonably extensive set of archival material which documents the activity of the SLLP from its formation in 1948 until its dissolution in 1971. The main deposit of papers relating to the SLLP is held in the local studies section of Lewisham Public Library. The sections of the archive on which this paper is based may be divided in three groups. First, the SLLP executive committee and general council minutes and related material document the formal aspects of the party's activity. Second, there is a series of files relating to the internal organisation and membership of the party. Finally, there are a series of files containing general correspondence about the party. We also examined the other material on the party in this archive, primarily relating to electoral organisation, and material of the SLLP in the Jim

Raisin (Labour's London District Organiser, 1946-58) Papers and the London Labour Party Papers both held at the London Metropolitan Archive and the national party papers held at the Labour History Archive and Study Centre in Manchester. However, these latter sources are not used here because they either add little to the data we use (only mentioning very senior members of the party) or they relates only to forms of activism not considered here.

In order to address the alternative explanations of changing levels of party activism we focused on the kinds of activism which sustain political parties over time, excluding not just social activity but electoral campaigning as well. We created a hierarchical classification of the roles undertaken by activists based on the approach developed by Seyd and Whitely:

(3) 'external' representation: publically elected positions (primarily local councillors)

(2) 'internal' representation for elected positions within the party

(1) 'regular' activity for party day to day inter-election activity.

In order to trace patterns of activism we adopted a systematic approach to the party archives to create encounter histories of activists. We selected six 'target years' spanning the period of the constituency's existence from its creation in 1948 to its dissolution in 1971; 1948/9, 1952/3, 1955/6, 1961/2, 1964/5 and 1969/70. These years, which saw different types of elections were selected to enable us to investigate changes in campaigning, although electoral work is not discussed in this article. We created a database noting amongst other things precisely every mention of an individual including details of the sources they were found in, the date of the source and biographical information about the individual. Altogether the archival material revealed the names of 1393 separate activists in just over 1200 documents.[15]

From the biographical profiles, and using this classification scheme we created two sets of 'encounter histories', which summarize in analysable form when and in what capacity we encounter each individual. The first set of encounter histories were for the open capture recapture models. Where an activist was not encountered in a particular period then this was

indicated with a ‘0’. Where we found reference to an individual we used the relevant number to indicate the highest level of activity undertaken by an activist in that period. Thus an encounter history of the form 102233 would indicate an individual found undertaking regular campaigning in 1948/9, not encountered in 1952/3, found holding internal elected posts in 1955/6 and 1961/2 and as a councillor in 1964/5 and 1969/70. The second set of encounter histories were constructed to investigate population sizes using closed capture recapture models where we created separate sets of encounter histories for each year and each level of activism. We treated the three components of the archive, the executive minutes, the organisation correspondence and the general correspondence as three different samples of the activist population The encounter histories represented patterns of occurrence in different sources, so say for internal representatives in 1952/3 an encounter history of 101 represented an individual mentioned in the executive minutes and the general correspondence files but not in the organisation correspondence.

Results

Considering first the 'open' capture recapture models to study population dynamics. A model was initially tested with three states (regular activist, internal representative and external representative) where survival, encounter and transition parameters were allowed to vary over time. GOF testing of this model indicated that whilst most assumptions of the model appeared reasonable test 3G.SR, which examines whether new and established members of the population behaved differently, returned a significant result. For this reason we added parameters to this model to also estimate separate parameters for 'established' (those who have been previously encountered) and 'new' (those encountered for the first time) activists. In the biological literature because this model was developed to deal with the difference between juveniles and adults it is often referred to as a two age model. It is a reduced version

of a model which has all parameter estimated separately for each cohort. In this general model there are a total of 108 parameters, although not all of these can in fact be estimated.[16]

This provides a base against which to compare simpler models. Models were constructed in each case by examining whether there was support in the data for separate parameters for new and established activists, and then whether there was support for parameters to vary over time. We began this process looking at the features of the data which we were most confident of such as the consistent (and high) encounter probability for external representatives, and moving from these to the parameters of greatest substantive interest. Model selection was approached by comparing the change in AIC as parameters were reduced, looking for the model with the lowest AIC. The results of this process are shown in table 2, with the model with the most support in the data show at the top.

This best fitting model can be described by considering the survival and encounter parameters for each of the states and the transition parameters between states. The survival parameter in this model were: for regular activists separate parameters for new activists in each time period plus a constant for established activists, for internal representatives there were separate parameters for new and established activists (both constants) and for external representatives survival was constant. The encounter parameters were: for regular activists separate parameters for new and established activists (both constants), for internal representatives encounters varied over time, for external it was a constant. Transitions between levels of activism were modeled as follows: internal to regular has separate parameters for new activists in each time period plus time for established activists, internal to external has separate parameters for new and established activists (both constants), internal to regular has separate parameters for new activists in each time period plus time for established activists whilst internal to external, external to internal and external to regular were all time dependent. This model has fifty three parameters but given our data only fifty one of these

could actually be estimated and a number of others had standard errors which were very large. A sample of the parameters for which we could produce reasonable estimates, and which are of substantive interest in the analysis of population dynamics below are found in table 3. Once established, for activists at all levels survival rates were constant over time. This implies that any change in the size of the activist population were not due to increasing resignations from the party, but rather was based on changing patterns of recruitment. It also makes it appropriate to estimate average duration of different types of activity, with the results are shown in table 4.[17]

------- Table 2 about here -------

------- Table 3 about here -------

------- Table 4 about here -------

Both closed and open methods were used to look at changes in the population size. The size of the councillor population can be fully enumerated, but we attempted to use closed methods to estimated the population of internal representative and regular activists. The sample coverage results for the internal representatives are shown in figure 2. These results indicate that there were substantially more individuals holding representative roles in the 1950s than there were in the 1960s in a way which broadly follows the overall picture of the membership of the constituency party. In the two periods of growth in the membership of the constituency party from 1948-1952 and from 1961-1964, the number of activists grows. In the other periods, where membership declined, activism also declines.

---------- Figure 2 about here ----------

For the regular activists our sources provided a much lower coverage of activists and hence relative to the overlap between sources, dependency and heterogeneity were much greater problems, with some of the results shown in table 5. In most cases there were obvious difficulties as illustrated by the results for 1961/2, where there is an extremely large

confidence interval using the log-linear method and a low sample coverage level, although we can still provide a lower bound estimate. Only for 1964/5 we were able to generate a reasonable estimate of the population size of 'regular' activists, with the log-linear estimate, including confidence interval not overwhelming the substantive result and sample coverage over .55.

-------- Table 5 about here ----------

Despite these problems changes in population size can still be addressed by looking at the ratio of arrivals to departures in the population using open models. We estimated rates of population change (λ: >1 growth, <1 contraction) for both internal representatives level activists and for the combined internal and 'regular' activist population. The results for the internal representatives are shown in table 6 and for the combined population in table 7. These results, more extensive than but consistent with those of the closed capture methods, show substantial changes in the level of activism with large declines in all forms of activism from the 1950s to the 1960s matching the substantial decline in membership in this period. We also detected increases in the activist population at all levels in the two periods of membership increase, 1948-52 and 1961-4. Overall, in the South Lewisham Labour Party there was a substantial change in the level of activism and, although not moving precisely in parallel, the direction of movement was the same as the membership figures.[18]

---------- Table 6 about here ----------

---------- Table 7 about here ----------

Discussion of Results

Susan Scarrow's 'core stability' model suggests that constituency organizations had a relatively stable activist core whose composition and size was relatively unaffected by the relatively rapid rise and then decline in membership during the period. We did find that there was something of this stable core, particularly surrounding the councilors. However, in

contrast to the view that decline was restricted to social organization we found that changes, including the long term decline from the early 1950s, also affect the core activist population. We also found that in both regular and internal states established activists had a greater probability of 'survival' (ie remaining active) than new activists, rather than there being considerable stability, there was in fact substantial levels of transience in the activist population.

'Organisational response' accounts suggest that the South Lewisham Labour Party's continuing and exceptionally high desire for activists should have two consequences: first that its activist base should be abnormally large and second it should not have been susceptible to kinds of decline found elsewhere. Considering first the size of the activist base, we were able estimate the total external, internal and regular activist population only for 1964/5. This estimate, which of course excludes social members and those active only at election times, is about 450, 8.6 per cent of the declared membership for that year of 5234. Equivalent data is not available for other constituency parties but rough estimates of the overall proportion of members active, on a broader definition than we have used, vary between 5-10 per cent of memberships which at a generous estimate were generally less than a third of that in South Lewisham. The first expectation seems virtually certain to be correct. The second prediction concerns the change in this figure over time. In this respect, even where we were not able to generate estimates of totals we were able to look at rates of change using the relative rates of arrival and departure. Our findings were that contrary the 'organizational response' view the SLLP activist base declined substantially over time. Overall then, whilst our results are consistent with the idea that local demand factors may explain the difference between the number of activists in different places, they indicate that this theory does not fulfill its main goal of explaining change over time.

The central feature of Seyd and Whiteley's 'selective incentives' model is the motivation of becoming and then working as a councillor. That there were some activists who were drawn into party activity by such desires is clearly indicated by the trajectories taken. In particular we found that not only were new recruits to lower levels of activism more likely to drop out than established activists, they were also more likely to move on to such higher levels of activism. The incentive to become a councilor does then seem to be of importance not just for the councilors themselves but also to a small number, particularly of new recruits to the party. However, once settled into regular activism not only did the likelihood of leaving activism decline, but the probability of getting more intensively involved did too. Although briefly rising in the immediate post-war period the rates of transition from internal and regular activism to external representation shown in table 3 were at very low levels, generally between 1% and 4% per year. With low levels of movement between the levels of activism, and with the councilors forming a fairly small proportion of a much larger activist population, it is unlikely that the incentive to have influence through being a councilor in fact played a substantial role in explaining changing levels of involvement beyond this group.

Finally, the 'party identification response' models do not seem to provide a good explanation of the relative stability of activism at higher levels. However, although not moving precisely in parallel, activism as a whole did move closely in line with membership in the constituency, rising and declining in the same periods as membership. For activism broadly understood supply side explanations of this kind seem the most promising.

Conclusion

In this article we have described a variety of different methods which sit under the 'capture recapture' heading. We then used these methods to construct models of different forms of activism in the largest Constituency Labour Party in post-war Britain. The estimates of population size and dynamics from these models were then used to examine alternative

explanations of changes in party activism, where because of the apparent absence of data alternative theoretical explanations had not been previously subjected to empirical scrutiny. This work has of both methodological and substantive significance.

Its methodological significance comes because historians very often want to know about general features of populations where there is little systematic data available. Capture recapture methods provide a set of tools to enable this. The potential of closed capture recapture methods to estimate the size of historical populations using two list-based sources has been discussed on a number of previous occasions. Closed capture recapture methods can be extended by utilising additional sources to test the assumptions on which population size estimates are based. Open capture recapture methods, which have not previously been seen in the historical literature, enable the examination of population dynamics including the possibility of testing hypotheses about the structures of populations based on individual level data. They can also be used to provide estimates of the rate of change of populations in situations where closed estimates are not possible. Classification and particularly multi-strata models offer important tools for dealing with the kinds of heterogeneity usually found in human populations. Goodness of Fit testing in open models and sample coverage and confidence intervals in closed models provide was of checking whether basic assumptions are fulfilled. The user-friendly software available to implement the analysis makes it possible for historians to study the dynamics of populations where such analysis would previously have seemed impossible.[19]

Substantively we constructed estimates of the number of activists and the dynamics of the activist population in the South Lewisham Labour Party to examine debates about changing numbers of activists and alternative explanations for this. Of course conclusions drawn from a single case study are necessarily tentative, although the South Lewisham case was chosen precisely because as the largest and best organised CLP in the country it provides

a critical test for 'organizational response' explanations of change. Overall we found that that none of the conventional explanations appears entirely adequate. Levels of activism clearly declined over time which in itself makes the core stability models problematic. Although the desire of parties for activists may explain why some parties are bigger than others, the continuation of this desire was not enough to sustain activism. Organisational response models are then not a compelling part of explaining why activism declined. We did find a stable core of councillors, as predicted by the 'selective incentives' model. However, this stability of the population of councillors, together with the decline in the number of other activists, means that they are now a much larger proportion of the activist population which make extrapolation back in time particularly problematic. The structure of the activist population, with this stable core of councillors alongside a more rapidly changing periphery suggests that separate accounts are needed of the motivations of these groups which does tell against simpler versions of the 'party identification response' model. However, with activism and membership moving in concert it is this approach which our findings most support.

Overall then, despite the widespread view that there could simply be no evidence the approaches described here provide a way of using archival material to provide a systematic examination of the population of post-war political activism in Britain. Thus, capture recapture methods offer tools which can be used with conventional historical sources to address otherwise intractable questions about the size and dynamics of historical populations.

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